

(12) **UK Patent Application** (19) **GB** (11) **2 185 499** (13) **A**  
(43) Application published 22 Jul 1987

(21) Application No <b>8601209</b>	(51) INT CL <sup>4</sup> <b>D06M 15/37</b>
(22) Date of filing <b>18 Jan 1986</b>	(52) Domestic classification (Edition I): <b>D1P 1207 1260 1267 1279 1303 1317 1340 1341 DX</b>
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(54) **Treatment of cellulosic textile fabrics**

(57) Instead of the formaldehyde-containing resins customarily used in the treatment of cellulosic textile fabrics to improve such properties as crease- and shrinkage-resistance, a polyamide-epichlorhydrin resin is employed, preferably in conjunction with another polymer which reacts with said resin, e.g. an acrylic polymer.

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## SPECIFICATION

## Treatment of cellulosic textile fabrics

- 5 This invention relates to the treatment of cellulosic textile fabrics, for example those having a basis of cotton. 5

- It is common to treat such fabrics to improve their resistance to creasing and shrinkage or their 'handle' (the physical sensation they impart when held in the hands); and for this purpose it has for forty years or more been the practice to bring them into contact with a solution or dispersion of a resin which is the reaction product of a substance having reactive hydrogen atoms (eg, urea, melamine, phenol) with formaldehyde. However, it is now recognised that the use of such resins involves the release into the working environment of small amounts of formaldehyde; and because this substance is suspected to be harmful—even at very low concentration—when inhaled over long periods, some textile processors would now prefer to avoid using formaldehyde resins. 10 15

- According to the present invention, we make use of a type of resin which is not derived from formaldehyde but is instead the reaction product of epichlorhydrin with a polyamide whose repeating unit contains basic  $-NH-$  or  $-NH_2$  groups (as distinct from the non-basic  $-NH-$  group of the amide linkage  $-NHCO-$ ). Such a resin is for example that obtained by reaction of epichlorhydrin with the condensation product of diethylene triamine ( $H_2NCH_2CH_2NHCH_2CH_2NH_2$ ) and adipic acid ( $HO_2C(CH_2)_4CO_2H$ ). Polyamide-epichlorhydrin resins are used in the finishing of wool (a non-cellulosic textile) and in the treatment of paper to improve its wet strength. 20

- According to the invention, therefore, a cellulosic textile fabric is brought into contact with a solution or dispersion of a polyamide-epichlorhydrin resin. Preferably, treatment of the fabric is carried out in the presence of a second polymer which reacts with the polyamide-epichlorhydrin polymer and so improves its retention by the fabric. An acrylic polymer is suitably employed for that purpose. 25

- Treatment of the fabric is suitably carried out under conditions such as to leave on the fabric an amount of epichlorhydrin resin equal to 0.5–3% by dry weight of the fabric. The concentration of epichlorhydrin resin in the solution or dispersion employed is suitably in the range 50–300g/litre. 30

- The invention is applicable to the treatment of a wide variety of cellulosic fabrics, including those of mixed cellulose/synthetic type, and including woven, knitted and non-woven fabrics. The invention is further illustrated by the following Example: 35

- Example 35

The following ingredients were mixed:

- |    |  |      |    |
|----|--|------|----|
| 40 | Cationic polyamide epichlorhydrin resin in solution in water, pH about 3, of solids content 12.5% by weight, available from BIP Chemicals Limited under the name BEETLE® BT747 | 200g | 40 |
| 45 | Acrylic polymer in solution in water, pH about 6, of solids content 50% by weight, available from BIP Chemicals Limited under the name BEETLE® BT 8003                         | 50g  | 45 |
|    | Additional water   | 750g |    |

- 50 The mixture was adjusted to pH 8.5 with sodium carbonate, and then applied to a woven polyester-cotton (50:50) fabric by the conventional dip-and-pad procedure. The impregnated fabric was then dried at 130°C. 50

- The finish thus obtained had excellent durability to water-washing and dry cleaning, and the good properties of the handle of the fabric were retained after many washings in a domestic washing machine. 55

## CLAIMS

1. A process for the treatment of a cellulosic textile fabric by bringing it into contact with a resin solution or dispersion, in which the resin employed is a polyamide-epichlorhydrin resin.
- 60 2. A process according to claim 1, in which treatment is carried out in the presence of a second polymer which reacts with the polyamide-epichlorhydrin resin to improve its retention by the fabric. 60
3. A process according to claim 2, in which the second polymer is an acrylic polymer.
4. A process according to claim 1, 2 or 3, substantially as described with reference to the
- 65 Example herein. 65

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Printed for Her Majesty's Stationary Office by Burgess & Son (Abingdon) Ltd, Dd 8991686, 1987.  
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